What is claimed is:

1. An isolated nucleic acid molecule comprising DNA having at least an 80% sequence identity to (a) a DNA molecule encoding a UCP4 polypeptide comprising the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or (b) the complement of the DNA molecule of (a).

2. The isolated nucleic acid molecule of claim 1 comprising the sequence of nucleotides from about 40 to about 1011 of Figure 2 (SEQ ID NO: 2).

3. The isolated nucleic acid molecule of claim 1 comprising the nucleotide sequence of Figure 2 (SEQ ID NO: 2).

4. An isolated nucleic acid molecule comprising DNA encoding a UCP4 polypeptide, wherein said DNA hybridizes to the complement of the nucleic acid comprising nucleotides from about 40 to about 1011 of Figure 2 (SEQ ID NO: 2).

5. An isolated nucleic acid molecule comprising DNA having at least an 80% sequence identity to (a) a DNA molecule encoding the same mature polypeptide encoded by the cDNA in ATCC Deposit No. 203134 (DNA 77568-1626), or (b) the complement of the DNA molecule of (a).

6. The isolated nucleic acid molecule of claim 5 comprising DNA encoding the same mature polypeptide encoded by the cDNA in ATCC Deposit No. 203134 (DNA 77568-1626).

7. An isolated nucleic acid molecule comprising (a) DNA encoding a polypeptide having at least an 80% sequence identity to the

sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or (b) the complement of the DNA of (a).

8. The isolated nucleic acid molecule of claim 7 comprising (a) DNA encoding a polypeptide comprising the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or (b) the complement of the DNA of (a).

9. An isolated nucleic acid molecule comprising (a) DNA encoding a polypeptide scoring at least 80% positives when compared to the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or (b) the complement of the DNA of (a).

10. A vector comprising the nucleic acid of claim 1.

11. The vector of Claim 10 operably linked to control sequences recognized by a host cell transformed with the vector.

12. A host cell comprising the vector of Claim 11.

13. The host cell of Claim 12, wherein said cell is a CHO cell.

14. The host cell of Claim 12, wherein said cell is an *E. coli*.

15. The host cell of Claim 12, wherein said cell is a yeast cell.

16. A process for producing a UCP4 polypeptide comprising culturing the host cell of Claim 12 under conditions suitable for expression of said UCP4 polypeptide and recovering said UCP4 polypeptide from the cell culture.

17. An isolated UCP4 polypeptide encoded by the DNA of claim 1.

18. An isolated UCP4 polypeptide comprising a polypeptide having at least an 80% sequence identity to the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1).

19. The isolated polypeptide of claim 18 comprising amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1).

20. An isolated UCP4 polypeptide scoring at least 80% positives when compared to the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1).

21. An isolated UCP4 polypeptide comprising the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or a fragment thereof sufficient to provide a binding site for an anti-UCP4 antibody.

22. An isolated UCP4 polypeptide encoded by the cDNA insert of the vector deposited as ATCC Deposit No. 203134 (DNA 77568-1626).

23. An isolated polypeptide produced by (i) hybridizing a test DNA molecule under stringent conditions with (a) a DNA molecule encoding a UCP4 polypeptide comprising the sequence of amino acid residues from about 1 to about 323 of Figure 1 (SEQ ID NO: 1), or (b) the complement of the DNA molecule of (a), and, if said test DNA molecule has at least about an 80% sequence identity to (a) or (b), (ii) culturing a host cell comprising said test DNA molecule under conditions suitable for the expression of said polypeptide, and (iii) recovering said polypeptide from the cell culture.

24. An isolated UCP4 polypeptide consisting essentially of amino acid residues 1 to 323 of Figure 1 (SEQ ID NO:1).

25. An isolated UCP4 polypeptide consisting of amino acid residues 1 to 323 of Figure 1 (SEQ ID NO:1).

26. A chimeric molecule comprising a UCP4 polypeptide fused to a heterologous amino acid sequence.

27. The chimeric molecule of Claim 26, wherein said heterologous amino acid sequence is an epitope tag sequence.

28. The chimeric molecule of Claim 26, wherein said heterologous amino acid sequence is a Fc region of an immunoglobulin.

29. An antibody which specifically binds to a UCP4 polypeptide.

30. The antibody of Claim 29, wherein said antibody is a monoclonal antibody.

31. A method of modulating metabolic rate in a mammal, comprising the step of up-regulating or down-regulating UCP4 activity in the mammal.

32. The method of claim 31, wherein said up-regulation of UCP4 activity stimulates an increase in metabolic rate in an obese mammal.

33. A method of conducting a screening assay to identify a molecule which enhances or up-regulates expression of UCP4, comprising the steps of exposing a mammalian cell or tissue sample believed to

comprise UCP4 to a candidate molecule and subsequently analyzing expression of UCP4 in said sample.

34. The method of claim 33, further comprising the step of analyzing mitochondrial membrane potential in said sample.

35. The method of claim 33, wherein said UCP4 is a polypeptide comprising amino acid residues 1 to 323 of Figure 1 (SEQ ID NO:1).

36. The method of claim 33, wherein said sample comprises human brain tissue.

37. The method of claim 33, wherein said candidate molecule is a small molecule comprising a synthetic organic or inorganic compound.

38. A method of conducting a screening assay to identify a molecule which decreases or down-regulates expression of UCP4, comprising the steps of exposing a mammalian cell or tissue sample believed to comprise UCP4 to a candidate molecule and subsequently analyzing expression of UCP4 in said sample.

39. The method of claim 38, further comprising the step of analyzing mitochondrial membrane potential in said sample.

40. The method of claim 38, wherein said UCP4 is a polypeptide comprising amino acid residues 1 to 323 of Figure 1 (SEQ ID NO:1).

41. The method of claim 38, wherein said sample comprises human brain tissue.

42. A method of detecting expression of UCP4 in a mammalian cell or tissue sample, comprising contacting a mammalian cell or tissue sample with a DNA probe and analyzing expression of UCP4 mRNA transcript in said sample.

43. The method of claim 42, wherein said sample is human brain tissue.